Subwoofers

SW10W, SW101W, SW12W, SW121W

Bass Drive Woofer

Swiss Audio

Owner's Manual

Please Read This Manual Before Operating Product.

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INTRODUCTION:

Since our inception in the car audio world, We at Swiss Audio have committed ourselves to manufacturing high quality car audio products with a creative edge unlike any other brands in the industry.

European design and heavy handed development make Swiss Audio's line of precision car audio a popular and identifiable entity in today's highly competitive market. The family of Head Units, Amplifiers, Subwoofers, Enclosures, Processors, Full Range speakers, Capacitors and Component speakers first gained recognition in Europe and was brought to the U.S.A. to quench an entirely new sonic thirst.

The classic silver-faced finish and famous Swiss Audio logo have captured the eyes and ears of enthusiast worldwide to push Swiss Audio to a new plateau of car audio design. Swiss Audio Products have a proven track record which is now worldwide.

We at Swiss Audio stand behind our quality, workmanship and service and continually strive to provide the best possible products your money can buy. Compare Swiss Audio products against anything the competition has to offer. We are confident you will be pleased with your purchase.

Thank you,

Swiss Audio

FEATURES AND SPECIFICATIONS

Swiss Audio's SW Bass Drive Series Woofers deliver performance and bold cosmetics. These woofers boast high-quality manufacturing features such as the tall J-surround for more control and added excursion, push terminals and an eye-catching Swiss-branded logo on its dust cap. The SW series will impress even the most experienced audiophile with low frequency power unlike any other.

SW10W: 10" BASS DRIVE WOOFER

- Power Handling: 300 Watts RMS
- 25mm / .98" Foam Surround
- 40 oz Strontium Magnet
- Frequency Response: 28Hz – 1kHz
- Efficiency: 91dB
- Voice Coil: 38mm 2-layer ASV, Single 4-Ohm

SW12W: 12" BASS DRIVE WOOFER

- Power Handling: 400 Watts RMS
- 25mm / .98" Foam Surround
  40 oz Strontium Magnet
- Frequency Response: 25Hz – 1kHz
- Efficiency: 92dB
- Voice Coil: 38mm 2-Layer ASV, Single 4-Ohm

SW101W: 10" BASS DRIVE WOOFER

- Power Handling: 300 Watts RMS
- 25mm / .98" Foam Surround
- 40 oz Strontium Magnet
- Frequency Response: 28Hz – 1kHz
- Efficiency: 91dB
- Voice Coil: 38mm 2-layer ASV
  Dual 4 Ohm, 2-Ohm, or 8-Ohm Capable

SW121W: 12" BASS DRIVE WOOFER

- Power Handling: 400 Watts RMS
- 25mm / .98" Foam Surround
- 40 oz Strontium Magnet
- Frequency Response: 25Hz – 1kHz
- Efficiency: 92dB
- Voice Coil: 38mm 2-Layer ASV
  Dual 4 Ohm, 2-Ohm, or 8-Ohm Capable

Choosing an Enclosure

Choosing an enclosure can be one of your most difficult decisions. There are several types available. The definitions listed here are for the most common: Sealed, Ported and Bandpass. This will help you choose which enclosure is best suited for you.

Sealed Enclosures: This is the most common enclosure to use for several reasons. They are the easiest to build and utilize the least amount of space. The response of the driver is tight and controlled. Since the enclosure is airtight, the woofer does not flop around or loose control when played at high volumes. The disadvantage of a sealed enclosure is that you need more power to drive the woofer. Sealed enclosures are perfect if you want a wider frequency bass response and the most accurate sound reproduction possible.

Ported Enclosures: Ported enclosures are generally used with low frequency drivers. Although they are harder to build than sealed enclosures, ported enclosures have a rough estimate of 3 dB (decibels) of increased volume than a sealed enclosure. To gain that kind of increase with a sealed enclosure, you would need to double the power of the amplifier. While ported enclosures benefit from increased efficiency, they are not as precise as a sealed enclosure. As compared to a sealed enclosure, ported boxes suffer from poor driver control at low frequencies. Ported enclosures trade their efficiency for ultimate bass extensions.

Bandpass Enclosures: The best way to describe a bandpass enclosure? They are half sealed and half ported. A bandpass enclosure uses a sealed enclosure and a ported enclosure to amplify the bass response. The advantages of a bandpass enclosure are simple: accurate bass response at lower frequencies. The disadvantage is that they only play low frequencies and the frequency range is very narrow, no more then a 30-Hertz frequency spectrum from where the enclosure is tuned. The worst part of a bandpass enclosure is you will never know when you are overplaying the woofer(s). Since the waves are generated in the ported side of the enclosure and then fires through the ports, the distortion will remain in the enclosure. This is the main reason manufacturers do not support bandpass-designed enclosures. We do not recommend using any woofer in a bandpass enclosure unless the woofer was specifically engineered for a bandpass enclosure.

Building An Enclosure

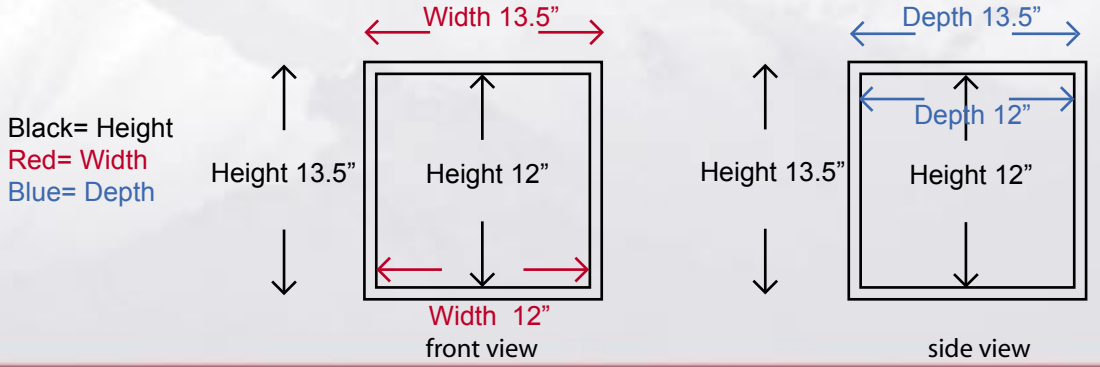
Calculating enclosure volumes is simple we are going to give you the mathematical equation of how to calculate the enclosure that you intend to build. If you were to build an enclosure your mathematical equation should look like this **HEIGHT x WIDTH x DEPTH / 1728 = _____ Box volume.** Do not forget to subtract the thickness of the wood that you have selected to use. The most common material used would be ¾"MDF (medium density fiberboard).

EXAMPLE:

If you were to build a one cubic foot enclosure and you have chosen to use ¾" MDF material your outside dimensions would equal 13.5" Height x 13.5" Width x 13.5 Depth. Then you would subtract 1.5" from your Height, Width, and Depth. The reason you would subtract 1.5" instead of 0.75" is that you are subtracting the wood on booth sides front and back, left and right, and top and bottom. So the internal dimensions are 12" Height x 12" Width x 12" Depth. The mathematical equation would be

12 HEIGHT x 12 WIDTH x 12 DEPTH / 1728 = 1 CUBIC FOOT. Although we used a perfectly square enclosure for this example. The enclosure does not have to be square. The enclosure can be any shape that is preferred.

NOTE: Do not forget to subtract your woofers displacement. After you have subtracted the woofers displacement your enclosure would become smaller than 1 cubic foot. This mathematical equation is in inches and should be converted if needed.



Building An Enclosure

Now that you have an understanding of how to calculate an enclosure with equal top and bottom dimensions, we will show you how to calculate the volume of an enclosure with unequal dimensions (**Wedged Enclosure**). Since the top and bottom (or sides) are of unequal lengths, measure each length (i.e. Top is 7" and bottom is 9") and add them together for a total of 16". Dividing this by 2 gives the number to use for both top and bottom lengths (or sides, etc.) The process is similar to an enclosure with equal dimensions with the exception of an added equation. The complete formula will look like this:

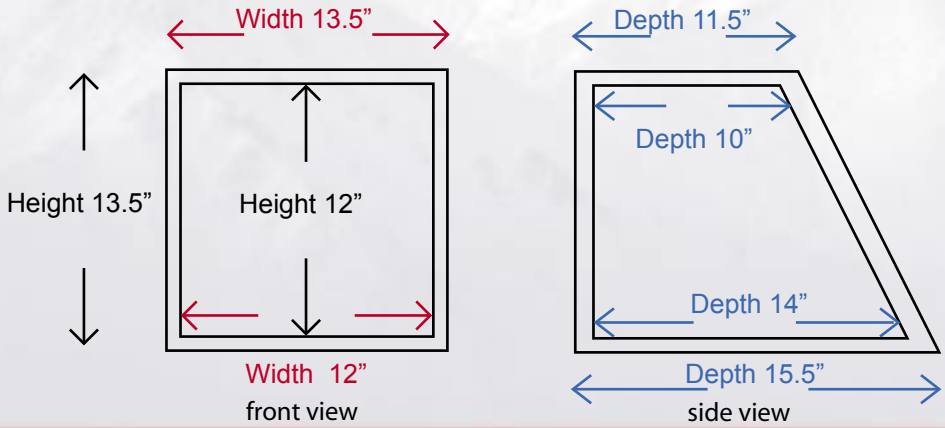
Height x Width x {(Top + Bottom) / 2 = Depth} / 1728 = _____

EXAMPLE

The external dimensions of a 1 cubic foot enclosure are 13.5" height x 13.5" width x (11.5" top depth x 15.5" bottom depth). First calculate the top and bottoms depth measurements. We have chosen to use .75" MDF making the internal dimensions 12" height x 12" width x (10" top depth x 14" bottom depth). Add the top and bottom depth then divide by 2 {(10 + 14) / 2 = 12}. Now calculate the enclosure's volume:

(Height 12" x Width 12" x Depth 12") / 1728 = 1 cubic foot

Black= Height
Red= Width
Blue= Depth



Building An Enclosure

To build a **Ported Enclosure**, the port's displacement must be factored in. The mathematical equation to calculate port displacement is:

(Pi x Port Radius x Port Radius x Port Depth) / 1728 = _____ Port Displacement

EXAMPLE

For this example, we will use a 4" port with a depth of 7.5".
{Pi (3.14) x Port Radius (2") x Port Radius (2") x 7.5"} / 1728 = 0.054 Port Displacement Subtracting this from the enclosure volume (1 – 0.054) gives a total enclosure volume of 0.946. Remember to subtract the woofer's displacement, supplied in the Recommended Box Sizes section of the Owner's Manual.

Slot Ports have become more popular than circle ports. The mathematical equation to convert a circle to a Slot Port is:

Pi x Radius x Radius =_____ square inches

EXAMPLE

We will convert a single 4" circle port with a depth of 7.5".
The mathematical equation is Pi (3.14) x Radius (2") x Radius (2") = 12.56".
12.56 square inches is the conversion used to make a Slot Port. Whatever dimensions used for the slot port, the calculation needs to be 12.56 square inches. Therefore, the slot port would be 1" wide and 12.56" tall. To make a slot port we simply multiply Height x Width = 12.56 square. The depth of the port will remain the same. Your converted port dimensions would be 1" wide x 12.56" tall x 7.5" deep.

(NOTE: Do not forget to calculate the slot port's displacement; it takes more air space than a circle port. When calculating the port's displacement, also calculate the thickness of the wood.)

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THIELE / SMALL PARAMETERS

Understanding Thiele / Small Parameters: Thiele / Small Parameters is used for box building programs that are available to the loudspeaker inthusists. Any loudspeaker inthusist can purchase a box building program and have a box engineered specificly for the loudspeaker that they posis. If you are a loudspeaker inthusist you will need the Thiele / Small Parameters to get the best performance out of your subwoofer / woofer. Allot of loudspeaker inthusists do not understand what Thiele / Small Parameters are. This section of the manual will help you understand what Thiele / Small Parameter means.

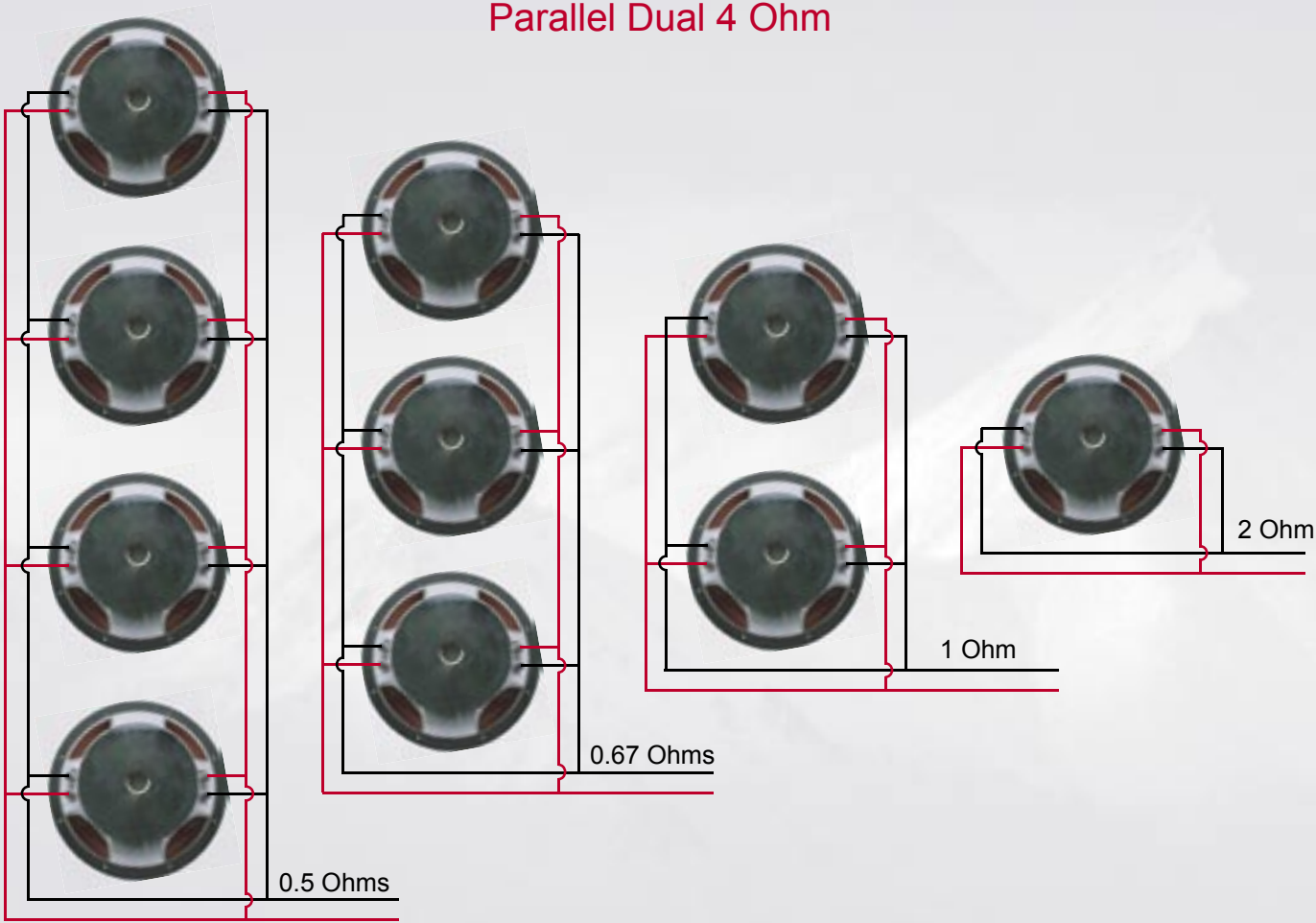
Fs: This parameter is the free-air resonant frequency of a speaker. Simply stated, it is the point at which the weight of the moving parts of the speaker becomes balanced with the force of the speaker suspension when in motion.
Qes: Qes is a measurement of the control coming from the speaker's electrical suspension system (the voice coil and magnet).
Qms: Qms is a measurement of the control coming from the speaker's mechanical suspension system (the surround and spider).
Qts: Qts is called the 'Total Q' of the driver at Fs. Qts is a measure of the driver's tendency to resonate at Fs, based on its overall characteristics.
Vas: Equivalent air compliance. The volume of air that has the same compliance as the driver's suspension.
Re: This is the DC resistance of the driver measured with an ohm meter.
Le: This is the voice coil inductance measured in millihenries (mH).
Mmd: Mass or weight of the speaker cone assembly (cone, coil and other moving parts).
Xmax: Linear (one-way) travel of the cone. Xmax is used to determine the maximum linear SPL capability of the driver.
RMS: This parameter represents the mechanical resistance of the driver's suspension losses.
Sd: This is the actual surface area of the cone, normally given in square com.
SPL: Sound Pressure Level, usually measured at 1 watt, at 1 meter in front of the loudspeaker.
no: Free air reference efficiency. This is given as a percentage.
EBP: The measurement is caluculated by dividing Fs by Qes. The EBP figure is used in many enclousre design formulas to determine if a speaker is more suitable for a closed or vented design. An EBP close to 100 usually indicates a speaker that is best suited for a vented enclosure. An EBP closer to 50 usually indicates a speaker best suited for a closed box design.
BL: The magnetic strength of the motor structure.
M.D.: Mounting depth of the speaker.
C.H.: Cut out hole of the speaker.

Recommended Enclosures				
	SW10W	SW101W	SW12W	SW121W
Min. Sealed Cu. Ft.	0.5	0.75	0.75	1
Max Sealed Cu. Ft.	1	1.25	1.5	1.5
Minimum Ported Enclosure				
Box Volume	1.25	1	1.5	1.5
Port Size	2	2"	3"	3"
sq. inch port size	3.14	3.14	7	7
Port Length	9	9"	6.5"	6.5"
Tuning Frequency	28Hz	30Hz	40Hz	40Hz
-3dB	37Hz	39Hz	52Hz	52Hz
Port Displacement	0.001	0.0163	0.0263	0.0263
Recommended Ported Enclosure				
Box Volume	1.5	2	2.5	2.5
Port Size	3	4"	4"	4"
sq. inch port size	7	12.56	12.56	12.56
Port Length	11"	11.75"	8.75"	8.75"
Tuning Frequency	35Hz	35Hz	35Hz	35Hz
-3dB	32Hz	29Hz	44Hz	44Hz
Port Displacement	0.004	0.0854	0.0635	0.0635

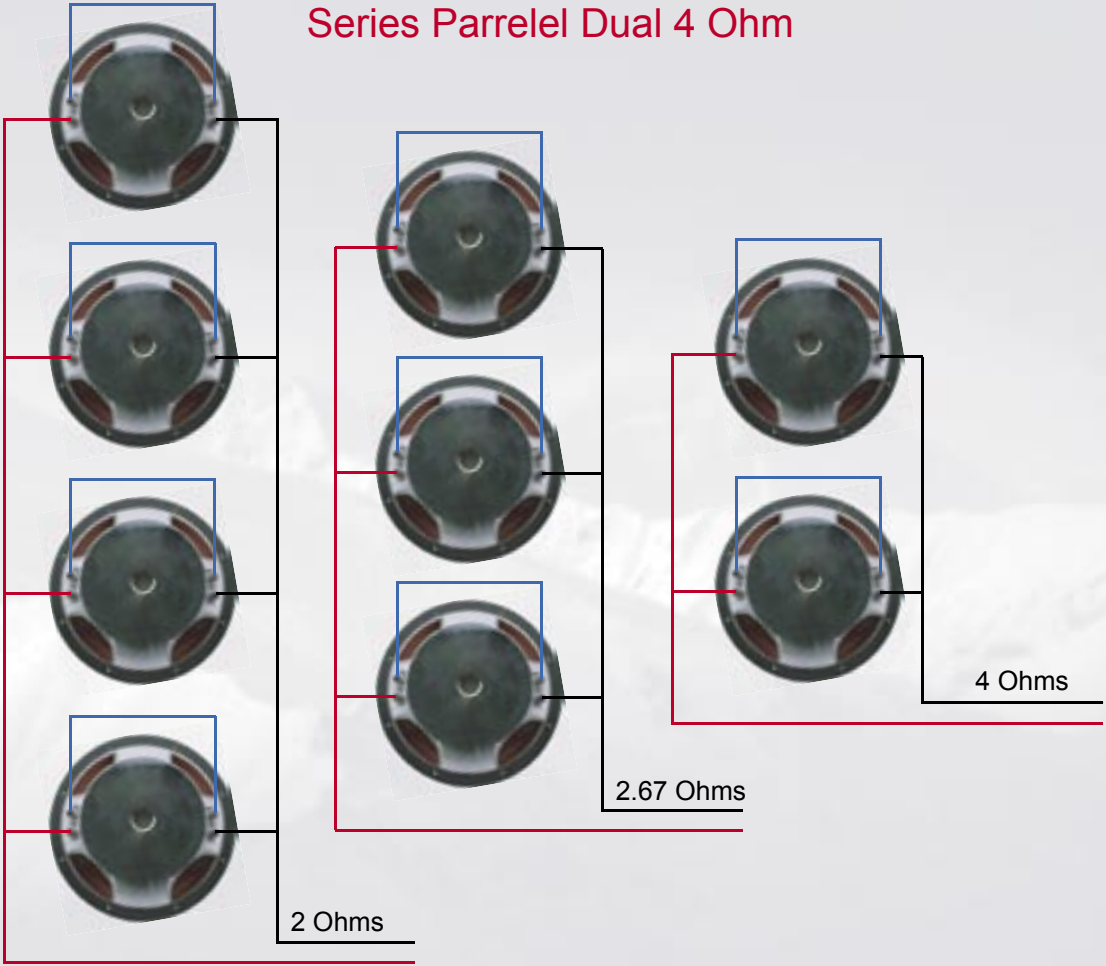
NOTE: The recommended enclosures listed are not for compitition use. Please call technical support for advised boxes when building an enclosure for compitition use.

Parameters				
	SW10W	SW101W	SW12W	SW121W
Fs	29.092	35.365	33.246	34.953
QES	0.442	0.552	0.682	0.627
QMS	2.812	5.503	6.6	6.41
QTS	0.382	0.51	0.618	0.571
Vas (Ltr)	64.23	25.22	94.54	56.47
Re (Ohm)	3.6	3.6 (x 2)	3.6	3.6 (x 2)
MMD (mkg)	70	110	90	110
Xmax	6mm +/-	6mm +/-	6mm +/-	6mm +/-
Rms	300	300	400	400
Sd (mM)	33.329	33.329	53.093	47.143
SPL (dB)	91	91	92	92
no	0.35%	0.55%	0.49%	0.37%
EBP	65.8	64	48.74	55.74
BL	9.862	8.558	9.753	8.058
Woofer Information				
Sub. Displacement	0.09	0.085	0.11	0.11
Mounting Depth	157mm	157mm	169mm	169mm
Inches	6.18”	6.18”	6.65"	6.65"
Cut Out Hole	235mm	235mm	281mm	281mm
Inches	9.25"	9.25"	11.06"	11.06"

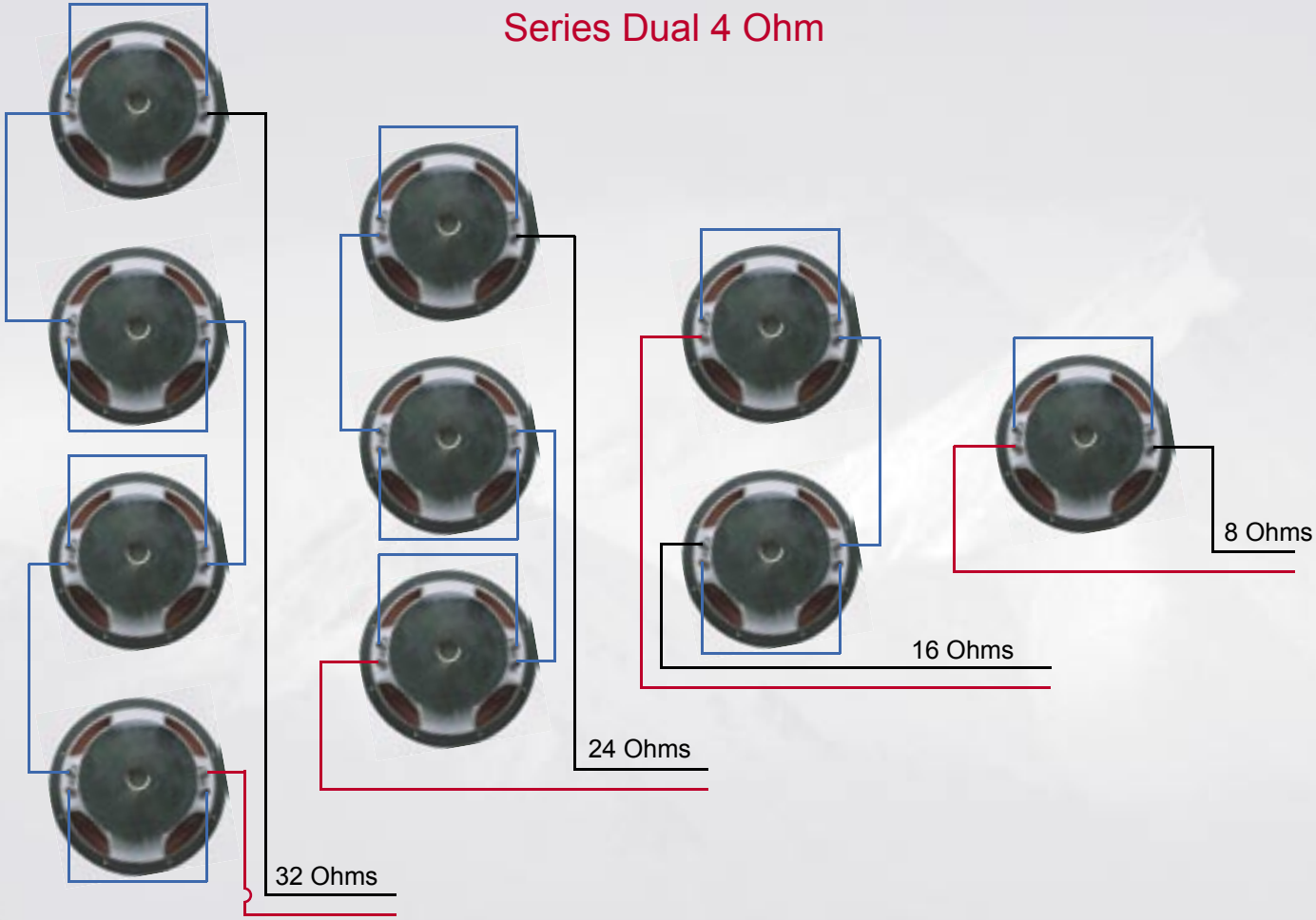
Parallel Dual 4 Ohm



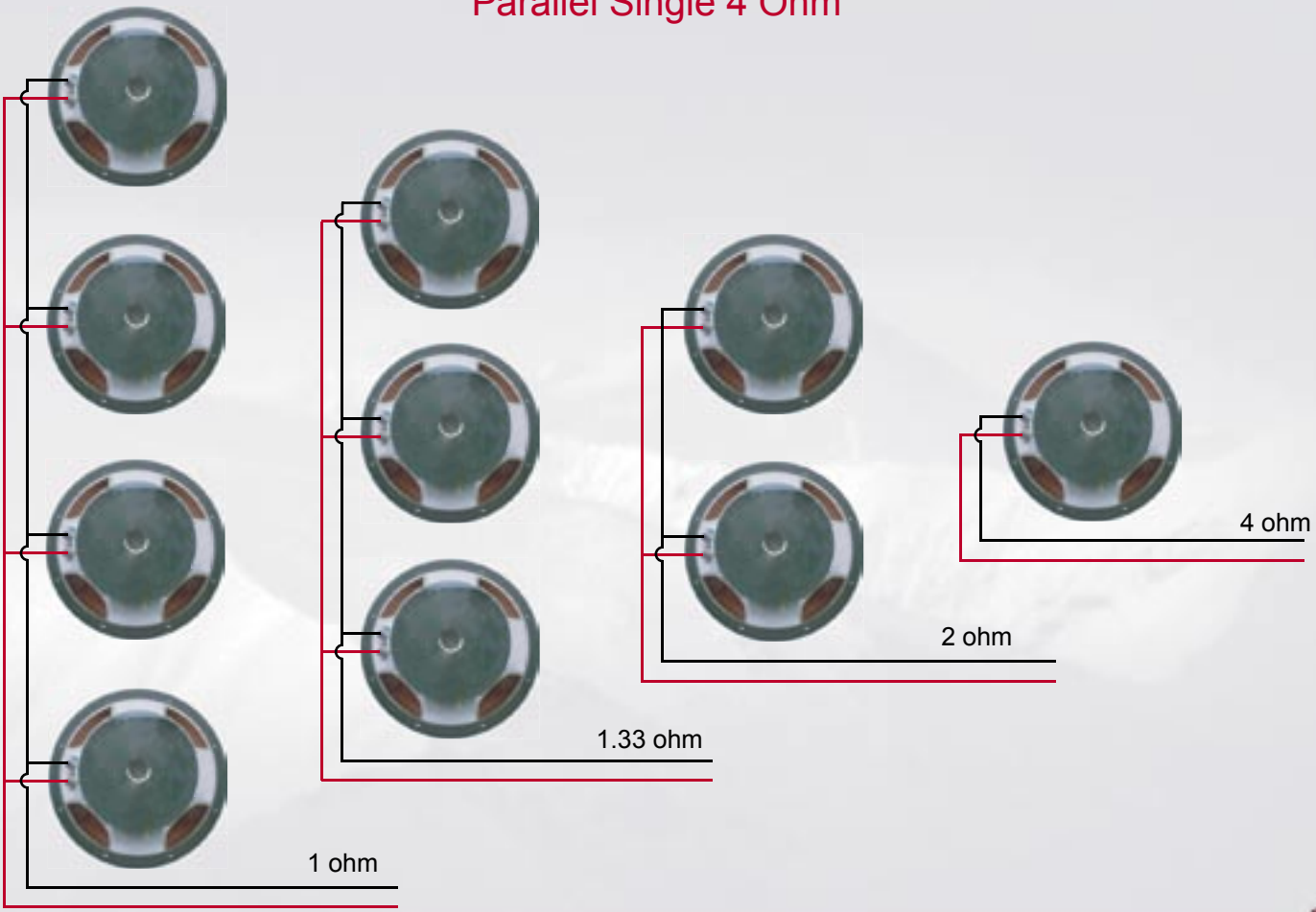
Series Parrelel Dual 4 Ohm



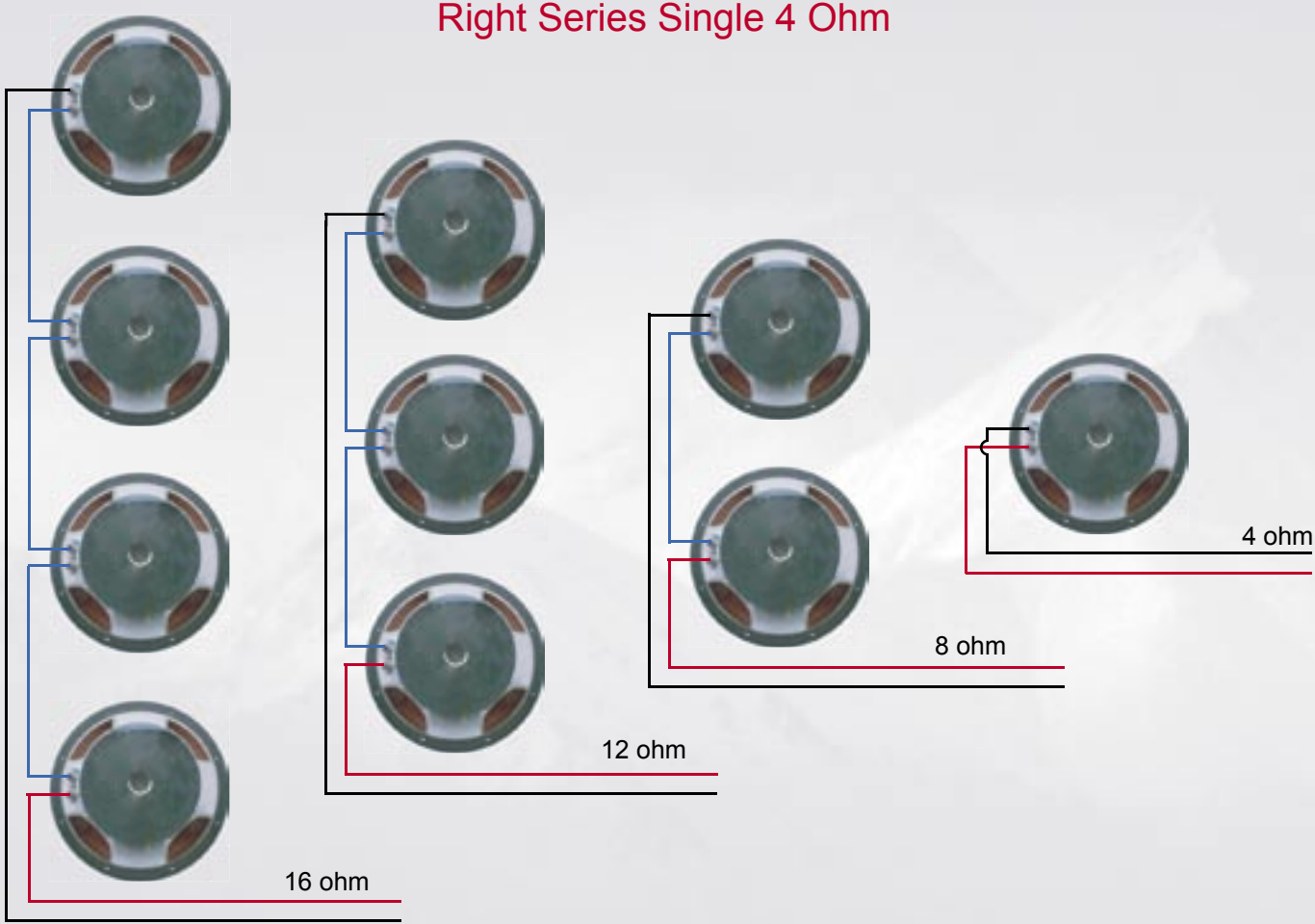
Series Dual 4 Ohm



Parallel Single 4 Ohm



Right Series Single 4 Ohm



TROUBLESHOOTING

SYMPTOM	CHECK POINT	CURE
NO SOUND	Is the amplifier power LED illuminated?	1. Check fuses in amplifier 2. Check turn-on lead 3. Check signal leads 4. Check gain control 5. Check source unit volume 6. Check fader control on source unit 7. Clean all contacts
	Is the amplifier overload LED illuminated?	Check speaker for short or amplifier for overheating
	Check impedance with Ohm meter	If no reading, replace speaker
	Check that the speaker moves freely	If speaker won't move, replace speaker
SPEAKER IS MAKING A RATTLING NOISE	Check that speaker is secured properly and tightened with screws	Tighten mounting screws
	Check enclosure construction	Check that the enclosure has no debris
	Check speaker polarity	Correct polarity
NO SOUND FROM ONE VOICE COIL	Check speaker leads	1. Inspect for short circuits 2. Check for open connections Reverse left and right speaker leads to determine if it is occurring before the speaker
SPEAKER IS DISTORTING AT HIGH VOLUME	Check speaker load impedance capabilities for the amplifier.	Confirm that the speaker load impedance recommendations are followed. Check the wiring configuration of the speakers. (To verify proper load impedance, use an OHM meter to measure the total load for each channel of the amplifier.
	Verify that amplifier and / or crossover	Select low-pass setting

WARNING & DISCLAIMER

Investigate the layout of your vehicle thoroughly before drilling or cutting. Take care when you work near the gas tank, gas lines, hydraulic lines, electrical components and electrical wiring. Do not use the equipment unmounted. Attach this system securely to prevent damage, particularly in the event of an accident or aggressive driving.

Do not mount the system so that wire connections are unprotected or are subjected to pinching or damage from nearby objects. Before connecting or disconnecting power connections at the system power terminals, disconnect the +12V DC wire at the battery end. Confirm that your source unit and other equipment are turned off while connecting the input terminals. If you need to replace the power fuse, replace it only with a fuse identical to the provided fuse.

Using a fuse of different type or rating may result in damage to the system, which is not covered by the manufacturer's warranty. Do not install any product where it may be subjected to excessive heat, moisture and dust or where it may be repeatedly kicked, brushed or bumped.

Make absolutely sure that the terminals for the products are connected to the proper inputs and outputs from the source unit. Never run the wiring on the outside of the vehicle or under it where it can be damaged by road hazards or any moving parts of the vehicle. Use existing wire channels, sills, panels and molding strips inside the vehicle to hide the wiring for safety and a neat appearance.

DISCLAIMER

IMPORTANT: Never cut any metal that is an integral part of the vehicle's safety or structural support system. If you are unsure, it is best to have the product professionally installed by an Authorized Swiss Audio Dealer. Never sacrifice your safety for sound.

NOTES

SWISS AUDIO INCORPORATION
114 South Berry Street
Brea, California 92821
Phone: (714)988-0380
Fax: (714)988-0381
www.swissaudioinc.com